

CLAIMS.

- 1.- Method for echo cancelling in a communication line
5 system, characterised in that said method is performed by
adapting tunable passive elements of a hybrid (5) which
forms part of the analog front end of said communications
line system, whereby the values of the tunable passive
elements are controlled by digital control means (4).
- 10 2.- Method according to claim 1, characterised in that a
scaling factor (k) is used for adapting said tunable
passive elements.
- 15 3.- Method according to claim 1, characterised in that
adapting said tunable passive elements comprises a step
of measuring the TX return loss gain in said hybrid (5),
whereby, when this gain differs from zero, the digital
control means (4) goes through a loop of adaptation of
20 the tunable passive elements until this zero value of
said TX return loss gain is obtained.
- 4.- Method according to claims 2 and 3, characterised in
that said hybrid (5) comprises a hybrid bridge (13) with
25 two branches (19), each comprising two tunable passive
impedances (Z_2 and Z_b) in series, one of which being a
tunable balance impedance (Z_b), said tunable passive
impedances being tuned such that the value of said
tunable balance impedance (Z_b) approximates as close as
30 possible the scaled impedance value of the parallel

circuit of the line termination resistance ($2R_t/2n^2$) in the TX paths, and the line impedance (Z_{tr+li}).

5.- Method according to claim 4, characterised in that
 5 said hybrid (5) comprises a current to voltage converter (14), the feedback impedances (Z_{fb}) of which being adapted so as to be equal to said tunable balance impedance (Z_b).

10 6.- Device for echo cancelling in a communication line system, characterised in that it comprises:
 - a hybrid (5), being part of the analog front end of said communication line system, said hybrid (5) comprising tunable passive elements, the values of which
 15 are controllable, by a
 - digital control means (4) coupled to said hybrid (5) and also included in said device.

7.- Device according to claim 6, characterised in that
 20 said tunable passive elements of said hybrid (5) are scalable by a predetermined scaling factor (k).

8.- Device according to claim 6, characterised in that
 said hybrid (5) comprises a hybrid bridge (13) and a
 25 current to voltage converter (14).

9.- Device according to claim 8, characterised in that
 said hybrid bridge (13) comprises two identical branches (19), each comprising a tunable balance impedance (Z_b) in
 30 series with a second tunable impedance (Z_2).

10.- Device according to claim 9, characterised in that said tunable balance impedance (Z_b) comprises a tunable resistor (R_0), in parallel with a series connection of a tunable resistor (R_1) and a tunable capacitor (C_1), and
 5 in parallel with another resistor (R_3).

11.- Device according to claim 10, characterised in that said another resistor (R_3) has the same resistance value ($2kR_t/2n^2$), as the line termination resistors (12) in the
 10 TX paths, scaled with said scaling factor (k).

12. Device according to claim 9, characterised in that said second tunable impedance (Z_2) in each branch (19) comprises a resistor (R_2) in series with a tunable
 15 capacitor (C_2), the value ($2kR_t/2n^2$) of said resistor (R_2) being the same as the resistance value of said line termination resistors (12) in the TX paths, scaled with said scaling factor (k).

20 13.- Device according to claim 9, characterised in that said current to voltage converter (14) comprises an operational amplifier (20) with tunable feedback impedances (Z_{fb}) having the same impedance values as said tunable balance impedance (Z_b).

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14.- Device according to claim 6, characterised in that said digital control means comprises a microprocessor (4).

